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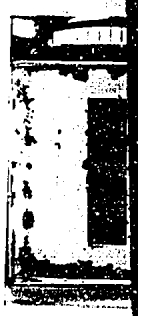

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SOURCE Periodicals as indicated.

## HUNGARIAN WEATHER REPORTS, APRIL - MAY AND AUGUST - SEPTEMBER 1952

/Comment: The following report contains Hungarian weather reports for April and May 1952 and for the period 13 August - 26 September 1952. No weather reports appeared in the August and September issues of Termeszet es Technika, which would ordinarily have covered June and July.

An article entitled "Sunspots and the Weather" is also included in view of its relevance to the unusual weather conditions which prevailed in Hungary last spring.

Degrees are given in centigrade.

Numbers in parentheses refer to appended sources./7

Alfred Zach

### April 1952

From extremely cold in March the weather turned summery during April. At Budapest the average temperature for the month reached 15.1 degrees, deviating by 4.1 degrees from the long-range average. Similar conditions prevailed all over the country and the April average was equaled only in 1841, that is, 111 years ago.

The effect of this unusual condition was heightened by the fact that summer weather arrived without transition and that the weather was still wintry at the beginning of the month. Spring was entirely absent this year.

The difference between the averages in temperature during March and April amounted to over 12 degrees, which is equivalent to a jump of 2 months. The diurnal warmth increased by 20 degrees in one week.

The warmth was accompanied by drought. In some parts west of the Danube, less than 5 millimeters of rain fell in contrast to an average of 50-60 millimeters. Budapest received 15 millimeters, showing a deficiency of 41 millimeters.



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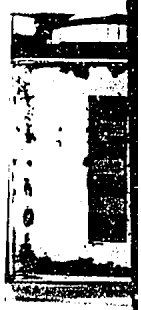

During the entire month, the sun shone every day for a total of 210 hours, or 30 hours above the average. The sudden change took place during 2 days, on 6 and 7 April. The warmest weather occurred on the 24th, when the temperature reached over 28 degrees at Budapest and as much as 30 degrees in the province. Warm temperature was observed at great heights on this day and zero degree was observed at above 3,000 meters. For a period of 21 days the temperature reached or exceeded 20 degrees and for 12 days it was above 25 degrees.

Weather conditions in Hungary are decisively affected by the Atlantic Ocean. The different degrees of temperature caused by the sun's rays, together with the earth's revolution, produce powerful whirlwinds in the latitude of Hungary. These whirlwinds, called cyclones, move from west to east and are responsible for the changes in weather.

The movement of cyclones is most frequent in the spring, particularly during April, resulting in erratic weather. This cyclone movement was practically absent in April this year. Instead, a descending air current prevailed for a long period, resulting in abundant sunshine.

The precise reason for the absence of the movement of cyclones is not known, but it is probable that this phenomenon was due to changes occurring in the sun. Sunspots were few in number prior to the unusual weather and this fact may supply the explanation. The interconnection is not known; however, research work for clearing it up is under way in the USSR.(1)

Sunspots and the Weather

Zoltan Berkes

The unusual weather, characterized by conflicting trends, which prevailed during recent months is of interest not only to the meteorologist but also to the practical man. With the help of modern meteorological service, the geographical extent of the extraordinary deviations can be examined. On the daily synoptic weather maps, the course followed by the cold and war air masses can be traced. In addition, comprehensive monthly weather reports, the so-called "climate" reports, prepared and distributed by telegraph by the weather stations of the various countries, include the monthly averages of temperatures, barometric pressures, precipitation, and the total amount of the precipitation which fell during the month. By plotting the deviations of these values from the long-range averages, the geographic distribution of extraordinary weather conditions is obtained.

During March, for example, the temperature was below average east of the Tromsoe-Hague-Athens line and even fell 7 degrees below average in the vicinity of Minsk, while it was 4 degrees above average in the vicinity of Madrid. During April, on the other hand, temperatures were 2-4 degrees above average in central Europe.

The flow of warm and cool air masses is regulated by the field of barometric pressure, that is, the location of cyclones. The distribution of average barometric pressures in March shows the large geographic extent of the high arctic barometric pressure which, in turn, was responsible for the flow of cold air from the northeast into central Europe.

During April, the core of the high barometric pressure was located in the Ukraine and thus caused sunny weather also in Hungary, as well as warm currents in the southeast-south direction. After 10 May, the arctic anticyclone again assumed large geographic expansion and the cold-air masses overran Finland, central Europe and the western part of the USSR with great velocity.

In view of the foregoing, the cause for the fluctuation of the unusual spring temperatures may be found in the vigorous development of the anticyclones of the arctic cold air masses in March and the second half of May, as a result



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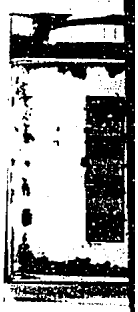

of which central Europe was flooded from time to time by so-called "air tongues." The weakening and withdrawal of these anticyclones during April permitted subtropical warm air masses to flow in. Between the two severest outbreaks of arctic cold (beginning of March and mid-May) there was an interval of approximately 70 days, corresponding to the usual 72-day cycle.

The reason that this year's arctic anticyclone assumed such large proportions and sent its cold air tongues deep into Europe is to be sought in the sun, since the sun's rays provide the energy which cause atmospheric currents on the surface of the earth. Air currents, the flow of air masses, are due to the difference in temperatures which exists between the equatorial "furnace" and the polar "ice-box." Changes in the emission of rays by the sun induce changes in the difference in temperatures mentioned above which, in turn, modifies the strength and velocity of the general air circulation.

Changes in the emission of sunrays are demonstrable and amount to a few percent. These changes are indicated also by a change in the number of sunspots. If the number of sunspots increases, the air circulation in general is enhanced, that is, the westerly wind becomes stronger in the temperate zone. By a reduction in the number of sunspots, on the other hand, the probability of air currents in the east-northeast direction is augmented.

This year no spots appeared on the sun at the end of February and the beginning of March and the number of sunspots was small in mid-March. As a result, central Europe was flooded by cold polar air from the northeast. Many sunspots appeared again at the end of March and during April and the fresher west-southwesterly wind brought warm, subtropical air into central Europe. The sunspots disappeared again on 10 May, thus permitting the polar anticyclone to become stronger and to send cold air masses toward the southern latitudes with renewed force.

It should be noted that the sunspots do not accurately indicate the changes in the sun's radiation. For this reason, radiation and weather are not always and everywhere congruous. The observation of sunspots is generally informative, but an exact solution of the problem may be expected only when radiation can be measured daily in very high strata of the atmosphere where the disturbing (radiation-absorbing) effect of the atmosphere does not exist. Beside the radiation reaching the earth's atmosphere, the radiation emitted by the earth, which is governed by the cloud formations (barometric pressure) in the various geographic areas, must also be systematically measured.

In sum, the effect of the changes in the general air circulation in the various geographic areas depends on a number of factors. The task of meteorology in the future will, therefore, consist in the accurate plotting of the air circulation with due regard to radiation received as well as emitted.(2)

May 1952

Alfred Zach

Frost in late spring is not unusual in Hungary. The record indicates that spring warming is uneven and is accompanied by relapses from time to time, sometimes amounting to as much as 10-15 degrees. The relapses are due to the cold-air masses invading Hungary from the north. In a state of equilibrium, the cold air continues to fall to a lower temperature without radiation and causes frost. Locations at low altitudes, the so-called "frost corners," are especially exposed to these conditions.

This year, May frost developed late and with fairly great severity. The first cold outbreak from the polar regions, which, however, did not reach Hungary, occurred on 9 May, when the temperature dropped to 4 degrees below at Moscow.



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The second cold outbreak developed on 16 May. It came through Poland and penetrated and enveloped Hungary both from the north and east. On the 17th, a north wind brought increasing cold. It snowed at Kekesteto and Galyateto (1,000 meters) at temperatures of 3 below and 2 below, respectively. At the same time, the Meteorological Institute reported that nocturnal cold was increasing in severity and that increasing morning frost was to be expected.

On the 18th, practically all Europe was enveloped by the cold weather. In Hungary, the temperature stood at zero, with frost along the soil surface reported in a few localities. At Sopron the temperature was zero even at a height of 1½ meters.

On the 19th, hoarfrost developed in 50 percent of the country, while the temperature fell to 2 below southeast of the Balaton, 5 below at Debrecen, and 4 below at Siofok.

On the 20th, frost developed in the entire country. East of the Tisza, snow fell and the diurnal temperature fell 10 degrees.

On the 21st, the cold reached its peak and hoarfrost developed everywhere. The temperature along the soil surface fell to 7 below at Siklos, 5 below at Debrecen, and 4 below at Pecs, with 2 and 3 below at an altitude of 1½ meters. The frost abated on the 22d and 23d and disappeared on the 24th.

The above data shows that this year's May frost was extremely severe and practically unparalleled. Similar cases occurred only long ago as, for example, on 22 and 24 May 1856, in 1885, and in May 1935.

The gravity of this year's frost may be summarized as follows: (a) it arrived very late in the year; (b) it extended over the entire country; (c) it lasted for a long time (nearly a whole week, from 18 to 23 May); (d) the plants were in an advanced stage; (e) the air was very dry; and (f) the frost was preceded by unusually warm weather which had lasted for many weeks.

Nevertheless, no irreparable damage to agriculture was caused by the frost. Given proper care, good crops are certain.(3)

13 - 27 August 1952

Istvan Kulin

The drought and excessive heat carried over into the period under review, but were ended on the 17th by the abundant, country-wide rain which accompanied a cooler air current.

The heat, reaching 30-34 degrees around the 10th, increased from day to day until it advanced to its peak at 35 degrees over the entire country on the 15th. On the latter day, the temperature rose to 40 degrees in a large part of the Great Plain and the unusual heat persisted for another day in several regions east of the Tisza. The excessive heat broke suddenly on the 17th as a result of cooler air currents accompanied by rains. Diurnal temperature fell to 21-23 degrees. Heat of the order of 25-30 degrees returned again for a few days, but the maximum diurnal temperature fluctuated mostly between 20 and 24 degrees.

The nights were unusually mild at first. Between the 14th and 18th, the temperature fell only to 20-24 degrees in wide areas of the country. However, after the 18th the temperature continued to fall, especially around the 24th, to as low as 10-13 degrees in general and even to 8-9 degrees in certain localities.



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Precipitation was more abundant than during the preceding fortnight. Rain fell in various sections of the country every day, beginning with the 16th. During 4 days (17, 18, 20, and 25) the rain was country-wide, while on 2 days (21 and 24) at least half of the country received precipitation.

Aside from smaller areas, the precipitation which fell between 1 - 27 August exceeded 25 millimeters. In Zala, Somogy, Baranya, and Tolna megyek west of the Danube, and on the Great Plain, as well as in the northern hilly region precipitation reached and even exceeded 50 millimeters in many localities.

The precipitation which fell up to the 27th nowhere reached the average for the whole month, but large parts of the country exceeded 50 percent of the monthly average. The largest part of the August precipitation fell after the 16th, while the rains were insignificant during the preceding 2 weeks. The abundant rains of recent weeks had an unusually beneficial effect on the plants and also facilitated soil preparation.(4)

28 August - 12 September 1952

The weather was warmer and the amount of precipitation was greater than average during this period.

During the last days of August, the temperature rose again above 30 degrees and even reached 35-36 degrees in a large part of the country on the 31st. Following a short period of cooler weather, the heat resumed its advance and reached 30-33 degrees in the largest part of the country around 6 September. After the 8th, however, cool air currents, accompanied by rains, lowered the diurnal temperature to a maximum of 20 degrees.

The nights, too, were mostly mild. During the last days of August and even in the first week of September, the nocturnal temperature did not fall below 20-22 degrees in many regions of the country. Nocturnal temperatures became cooler after 8 September and dropped, at a height of 1½ meters, to 6-8 degrees and, along the southern and western borders of Transdanubia, even as low as 3-5 degrees around the 10th. At the same time, temperatures of 2-3 degrees were measured in the latter regions.

Precipitation during the period under review was more abundant than in the preceding weeks. No rain fell on the last days of August (27 - 30), but the rains were country-wide on the 31st. As a result, total precipitation in August was in excess of the average for the month in some localities west of the Danube and on the Great Plain and over 50 percent of the average in the largest part of the country. Rain fell in spots every day between 1 and 6 September and very adundant country-wide rains, lasting 3 days, began on the 7th.

Precipitation in the largest part of the country totaled 25-50 millimeters between 1 and 11 September. West of the Danube and in the northern mountain region, 50-60 millimeters of precipitation fell in certain localities during the same period. Josvafo reported 97 millimeters and Bodvaszilas 100 millimeters. On these 11 days, precipitation in 75 percent of the country was in excess of the average for the first half of the month and even for the entire month in the Bodva region.(5)

13 - 26 September 1952

The weather was cooler than average and precipitation in a large part of the country frequent and abundant during the period covered.



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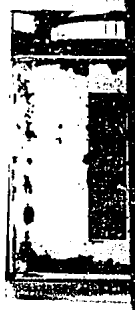

Diurnal temperatures were mostly mild. Around the 15th, the temperature in general did not rise above 16-18 degrees and in the western part of Trans-Danubia the maxima were 13-15 degrees. On the 17th, the temperature reached 22-23 degrees, the average for the season, in the largest part of the country, but after the 20th the thermometer dropped again to approximately 15 degrees. During the last days of the period under review, there was a renewed slight rise in temperature.

Nocturnal cooling was severe and the first early-autumn frost appeared in numerous regions. In the night following the 13th, the air cooled off to 6-10 degrees. Subsequently the cooling increased. On the 17th, the temperature at a height of 1½ meters fell to 1-2 degrees in many regions and as low as zero at Nyiregyhaza. At the same time, the temperature along the soil surface dropped to 1 and 2 below in the northern regions east of the Tisza and in the vicinity of Miskolc. Soil frost reappeared with equal severity at dawn on the 21st and 22d and covered an extended area. After the 22d the frost disappeared and the air did not cool off below 10-12 degrees in a large part of the country.

Precipitation was frequent and occurred in satisfactory quantities. During the period 13 - 17 September, rain fell only on the 15th on a small area. On the 17th, country-wide rains lasting for 3 days set in. The quantity of precipitation on each of the 3 days exceeded 10 millimeters on large areas and amounted to as much as 20-30 millimeters in the southern megyek on the 18th. Rain fell in small quantities also on the following day. Precipitation during the period 1 - 26 September exceeded 40 millimeters everywhere and amounted to as much as 60-70 millimeters in large areas. In the larger part of the Great Plain, about half of the northern mountain region, and especially the southeastern part of Trans-Danubia -- that is, in 45 percent of the total area of the country -- the total amount of precipitation between 1 and 26 September exceeded the average for the entire month. Even areas which are drier than average received over 50 percent of the normal precipitation.(6)

SOURCES

1. Termeszet es Technika, Vol CXI, No 6, Jun 52

2. Ibid., Vol CXI, No 7, Jul 52

3. Ibid.

4. Magyar Mezogazdasag, Vol VII, No 17, 1 Sep 52

5. Ibid., Vol VII, No 18, 16 Sep 52

6. Ibid., Vol VII, No 19, 1 Oct 52

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